

## CLAIMS

1. A soap comprising:  
phosphate salt; and  
fatty acid salts, in combination.
- 5 2. The soap of claim 1 wherein the phosphate salt is selected from the group of cations consisting of:  
hydrogen;  
ammonium;  
lithium;  
10 potassium; and  
sodium;  
and the group of anions consisting of:  
phosphate;  
pyrophosphate; and  
15 polyphosphate.
3. The soap of claim 1 wherein the fatty acid salt is selected from the group of anions consisting of:  
any fatty acid having carbons in the range of 6 to 36;  
any aromatic acid having carbons in the range of 6 to 36;  
20 branched chain fatty acid;  
straight chain fatty acid;

unsaturated fatty acid;  
polyunsaturated fatty acid; and  
aromatic acid;  
and the group of cations consisting of:

5           potassium;  
              lithium;  
              sodium;  
              ammonium; and  
              amine.

10           4.     The soap of claim 1 fortified by the addition of an alkaline metal salt that has a pH  
                  greater than 7.

5.     A process for treating water comprising:  
          mixing a phosphate fatty acid salt mixture with the water;  
          mixing a polyvalent metal precipitation agent with the water mixture;

15           adjusting the pH of the mixture to be in the range of 4 to 9; and  
              separating purified water from the resulting precipitant.

6.     The process of claim 5 wherein the precipitation agent is calcium chloride and the pH  
          is adjusted within a pH range of 6 to 9.

20           7.     The process of claim 5 wherein the precipitation agent is selected from the group of  
                  anions consisting of:

              polyvalent metal ion;  
              calcium;  
              magnesium;

aluminum; and

iron.

8. The process of claim 5 wherein the additional step of adding flocking agents to the mixture before separating the purified water from the precipitant.

5 9. The process of claim 5 wherein the step of adjusting the pH comprises adding acids, bases or salts.

10. A washing and water treatment process comprising the steps of:

washing articles with soap comprising phosphate salt and  
fatty acid salts, in combination and water;

10 and then, treating the resulting soap/water mixture by a process comprising:  
mixing a polyvalent metal ion precipitation agent with the soap/water mixture;  
adjusting the pH of the mixture to be in the range of 4 to 9; and  
separating purified water from the resulting precipitant.